“A STUDY OF EFFICACY OFCHSEMICAL AND SURGICAL MANAGEMENT IN FISSURE IN ANO’’

Dissertation submitted

To

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI

With partial fulfillment of the regulations for the award of the degree of

M.S (General Surgery)

Branch-I

GOVERNMENT KILPAUK MEDICAL COLLEGE CHENNAI.

APRIL -2016

DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation titled **"A STUDY OF EFFICACY OF CHEMICAL AND SURGICAL MANAGEMENT IN FISSURE IN ANO''** is a bonafide and genuine research work carried out by me under the guidance of Prof. K.K.VIJAYA KUMAR MS, department of General Surgery, Kilpauk Medical College, Chennai-10. This dissertation is submitted to **THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY CHENNAI** in partial fulfillment of the degree of M.S. General Surgery examination to be held in **April 2016**.

Date:

Place: **DR M.SASIKUMAR**

CERTIFICATE

This is to certify that this dissertation is the bonafide work of **Dr.M.SASIKUMAR**ON **"A STUDY OF EFFICACY OF CHEMICAL AND SURGICAL MANAGEMENT IN FISSURE IN ANO"** during his course in M.S.General Surgery from January 2015 to June 2015 at Government KilpaukMedical College, Chennai-10.

Prof P.N.SHANMUGASUNDARAM. MS.
Professor and Head of the Department,
Department of General Surgery,
GovtKilpauk Medical College,
Chennai-10

Prof K.K. VIJAYA KUMAR, MS
Professor of the General Surgery,
Department of General Surgery,
GovtKilpauk Medical College,
Chennai-10

Prof. Dr. R. NARAYANABABU M.D. DCH
DEAN
Govt. Kilpauk Medical College,
Chennai-10

CERTIFICATE BY THE GUIDE

This is to certify that the dissertation titled **"A STUDY OF EFFICACY OF CHEMICAL AND SURGICAL MANAGEMENT IN FISSURE IN ANO''**is a bonafide research work done by **Dr.SASIKUMAR**, post graduate in M.S. General Surgery, Kilpauk Medical College, Chennai-10 under my direct guidance and supervision in my satisfaction,in partial fulfillment of the requirements for the degree of **M.S. General Surgery**.

Date:
Place:

Prof K.K. VIJAYA KUMAR, MS.
Professor of General Surgery,
Kilpauk Medical College, Chennai-10

ACKNOWLEDGEMENTS

I would like to thank God for the things he has bestowed upon me .

I would like to thank my parents for making me who I am today and for supporting me in every deed of mine.

I thank each and every person involved in making this manuscript from inception to publication.

I am most thankful to Prof .Dr.R. Narayanababu M.D. DCH , Dean, Kilpauk Medical College and Hospital for the opportunity to conduct this study in the Department of General Surgery, Government Kilpauk Medical College Hospital, Kilpauk Medical College, Chennai-10.

My deepest gratitude to my guide and mentor Prof. K.K. VIJAYA KUMAR MS, Chief of Surgical Unit III, Department of General Surgery, Kilpauk Medical College, who has inspired me immeasurably during my training as a post graduate student.

I am very grateful to Prof P.N.Shanmugasundaram, MS, Head of the department of General Surgery for the encouragement and unrestricted permission to use the Department of General Surgery.

I also acknowledge the invaluable advice and counseling received from Dr. NAGARAJAN,MS, Dr.A.RAJESWARAN,MS,Dr. C.MALARVIZHI, MS, Dr. DIVYA, MS, Dr. ARUN, MS, Dr. VENKATESAN, MS, Dr. KAMAL RAJ, MS, and Dr. CHANDRA BOSE, MS.

This study would have not been possible without the support of my fellow post graduates and interns who have been a source of help in need.

The most important part of any medical research is patients. I owe great deal of gratitude to each and every one of them.

Welcome to your new class homepage! From the class homepage you can see all your assignments for your class, view additional assignment information, submit your work, and access feedback for your papers.

Hover on any item in the class homepage for more information.

Class Homepage

This is your class homepage. To submit to an assignment click on the "Submit" button to the right of the assignment name. If the Submit button is grayed out, no submissions can be made to the assignment. If resubmissions are allowed the submit button will read "Resubmit" after you make your first submission to the assignment. To view the paper you have submitted, click the "View" button. Once the assignment's post date has passed, you will also be able to view the feedback left on your paper by clicking the "View" button.

Assignment Inbox: The Tamil Nadu Dr.M.G.R.Medical Uty 2014-15 Examinations

	Info	Dates	Similarity	
TNMGRMU EXAMINATIONS	ⓘ	Start 01-Sep-2014 11:27AM Due 30-Oct-2015 11:59PM Post 30-Oct-2015 12:00AM	13%	Resubmit View

Copyright © 1998 – 2015 Turnitin, LLC. All rights reserved.

Usage Policy Privacy Pledge Helpdesk Research Resources

ABSTRACT

"A STUDY OF EFFICIACY OF CHEMICAL AND SURGICAL MANAGEMENT OF FISSURE IN ANO''

AIMS OF THE STUDY

1) To find the **age and the sex incidence of fissure in ano.**
2) To study the **various modes of clinical presentation of fissure in ano** and **the various types of fissure in ano.**
3) To evaluate the **effectiveness of topical 0.2% Glyceryl trinitrate** in the symptomatic relief and healing of anal fissures.
4) To compare the effectiveness of **lateral anal sphincterotomy** and **chemical sphincterotomy in fissure in ano.**
5) To establish **the role of glyceryl trinitrate as the first line treatment** for both acte and chronic fissures.

MATERIALS AND METHODS

SETTING

Study was a prospective comparative study done in Government Kilpauk Medical College Hospital from January 2015 to June 2015. The Study Population was divided into two groups.The Patients were of age group 18 to 60 years. 100 cases were studied.

STUDY POPULATION

The study population was divided into two groups of 50 patients each.

One study group was treated with topical application of 0.2% Glyceryl trinitrate along with sitz bath.

Oral antibiotics such as Cap Amoxycillin 500 mg BD and Tab. Metronidazole 400 mg TDS for the first 1 week along with topical 0.2% Glyceryl trinitrate application about the size of a pea, over the anal verge thrice daily for a period of 4 weeks and observed.

Another study group was admitted in the ward and taken up for lateral anal sphincterotomy under antibiotic over and a preoperative plain water enema.

The results were analyzed and published.

RESULT

In the end of the study we found that the surgical procedure for fissure in ano has better cure rate than medical management.

CONTENTS

AIMS OF THE STUDY

1) To find the age and the sex incidence of fissure in ano.

2) To study the various modes of clinical presentation of fissure in ano and the various types of fissure in ano.

3) To evaluate the effectiveness of topical 0.2% Glyceryltrinitratein the symptomatic relief and healing of anal fissures.

4) To compare the effectiveness of lateral anal sphincterotomy and chemical sphincterotomy in fissure in ano.

5) To establish the role of glyceryltrinitrate as the first line treatment for both acte and chronic fissures.

HISTORY

Moderate anal dilatation was first suggested by Recamier – 1838

Popular following its use by Lord in 1968.

Internal sphincterotomy – was first described by Eisenhammer, who divided the Sphincter in posterior position.

Lateral anal sphincterotomy- was decribed by Parks in 1967 and later modifiedByNotaras in 1969.

Klosterhalfen(1989) described the pathogenesis of anal fissure related to the vascular anatomy in the anus.

Schoutten proposed Vascular – anal resting pressure hypothesis.

Sohn-controlled/precise ballon dilatation of anal canal.

LITERATURE REVIEW

SURGICAL ANATOMY OF THE ANAL CANAL

The anal canal extends from the pelvic diaphragm upto the end at the anal verge .The muscular junction felt with a finger in between the rectum and analcanal as a thickened edge, its called as anorectal ring.

It lies in the anal triangle of perinenum in between the right and left ischiorectal fossae,which allow its expansion during passage of the faeces. The sacculations and taenia are absent here(as in rectum).

The length of the anal canal is 3.8cm.Direction of the anal canal is downwards and backwards.Inner involuntary and outer voluntary sphincter presents around the anal canal ,it keeps the lumen closed and in the anteroposterior slit form.

Relations of the anal canal

Anteriorly

a. In both sexes: perinal body

b. In males: membranous urethra and bulb of penis

c. In females:lower and of the vagina

Posteriorly

a. Ancoccygeal ligament

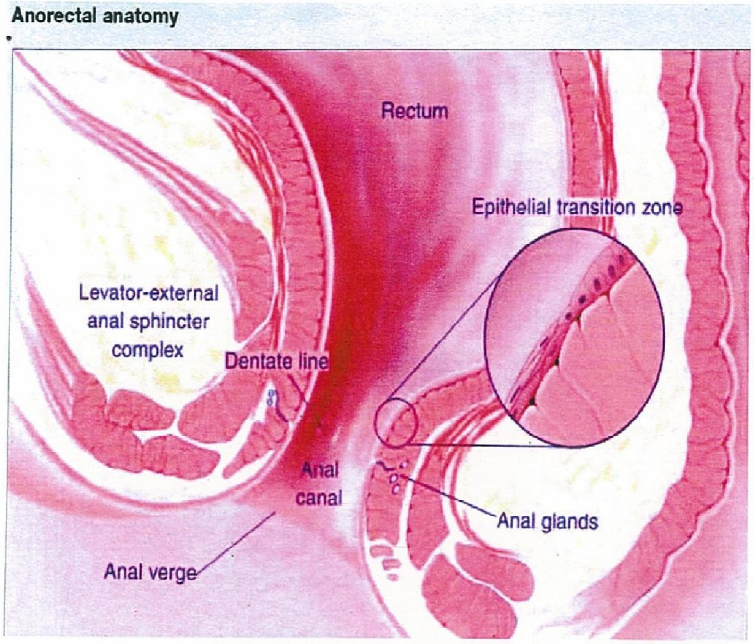
b. Tip of coccyx

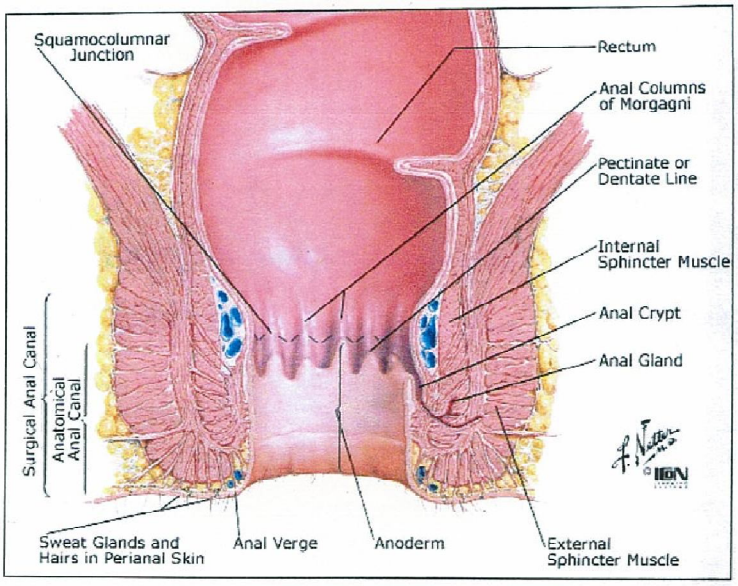
Laterally:Ischiorectal fossae

All round

Anal canal is surrounded by the spincter muscles,the tone of which keeps the canal closed.

ANATOMY OF ANAL CANAL





ANAL CANAL MUSCULATURE

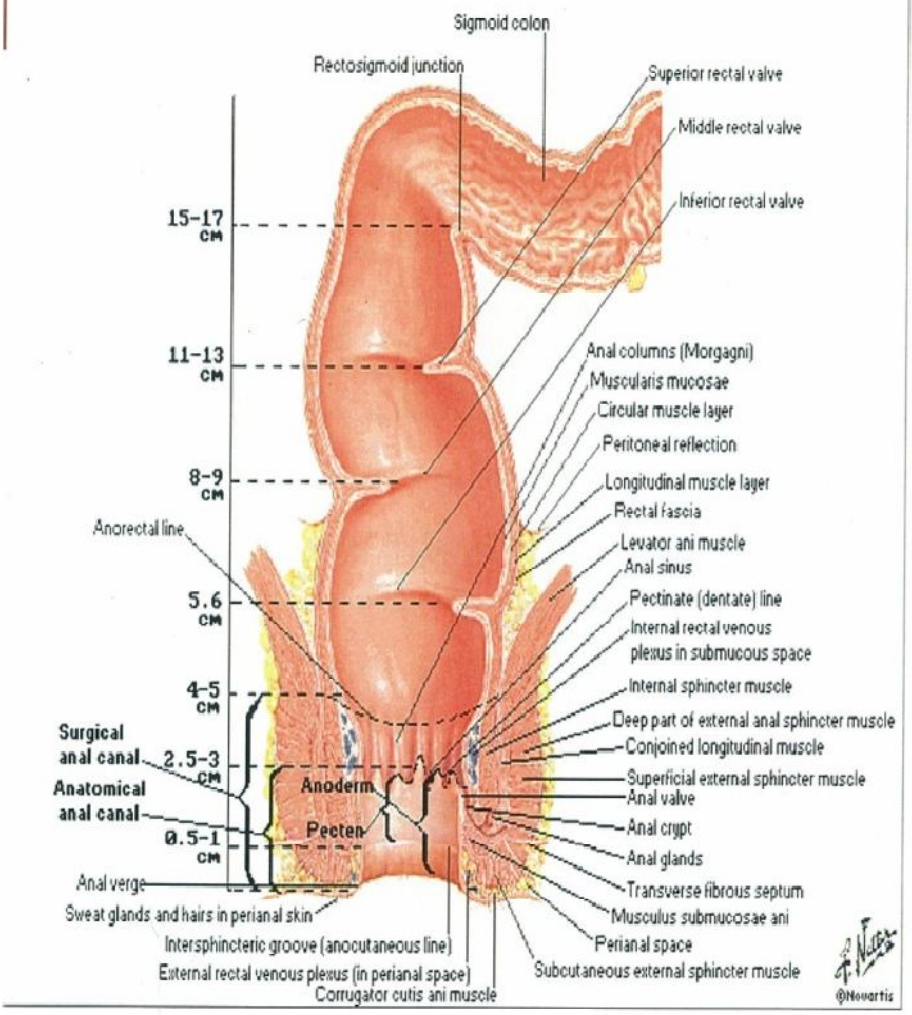
INTERNAL SPHINCTER:

The internal sphincter is thickened and continuation of the circular muscle coat of the rectum. It extends from the the pelvic diaphragm ends at the anal orifice.The length of the sphincter is 2.5cm and the thickness is 2-5mm.

LONGITUDINAL MUSCLE:

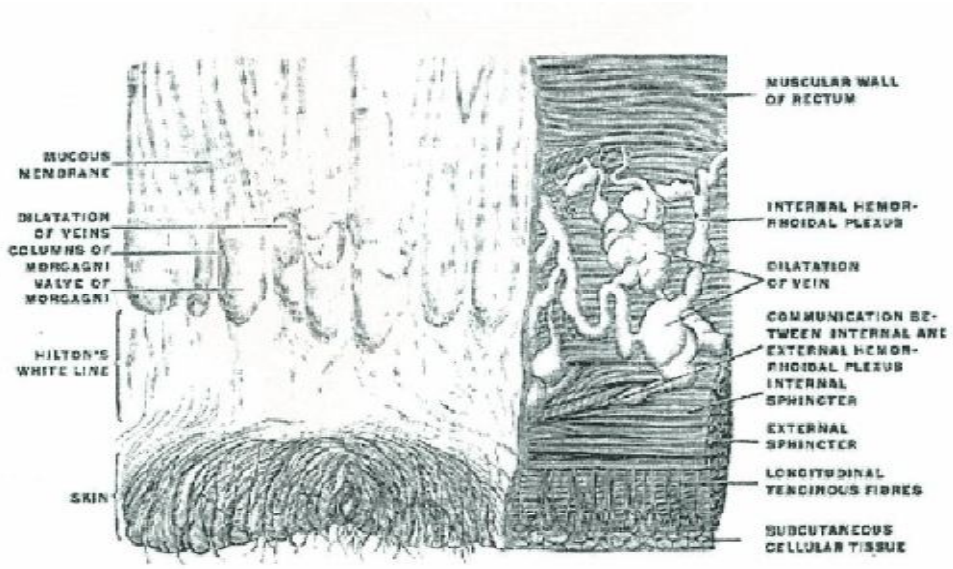
This muscle is continued with longitudinal muscle of the rectum.Puborectalis muscle fibers are intermingled with longitudinal muscle.The direction of the muscle is fanout through the lowest part of the external sphincter .It is inserted into the true anal canal and perianal skin.Corrugator cutis ani muscle itpresent as scanty fibers beneath the anal skin.

Rectum and Anal Canal

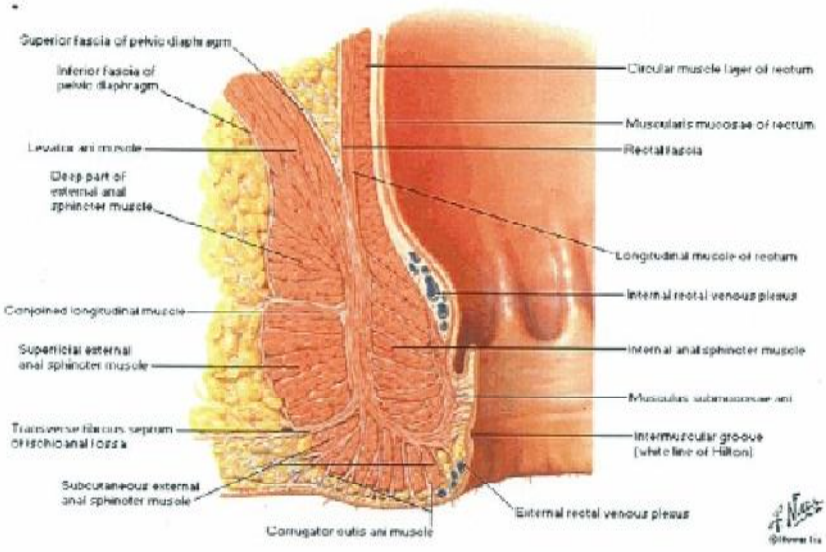


EXTERNAL SPHINCTER:

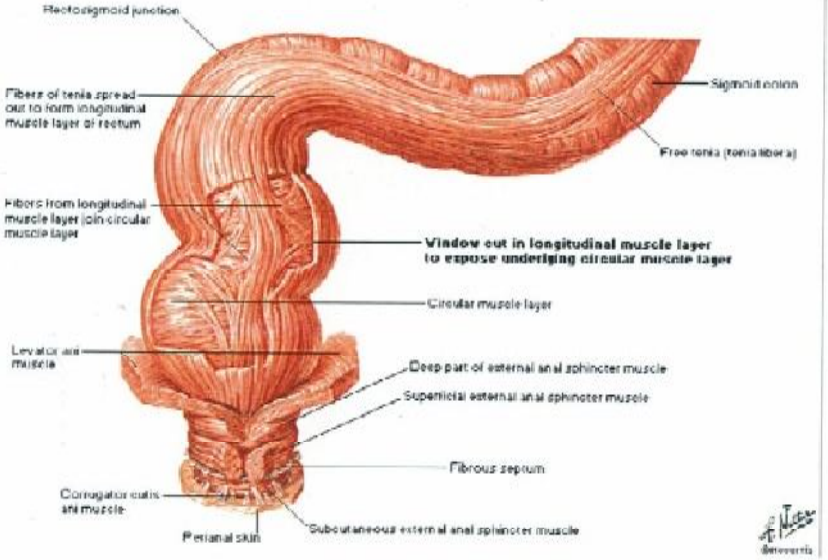
This sphincter is divided as deep ,superficial,subcutaneous portion .But now it is considered as one muscle .Its fibers anteriorly iinserted into the midperinal point in the male and in the female,it fixed with sphinctervaginae.Some fibers are posteriorly attached into the coccyx.



Anorectal Musculature
Frontal Section



Anorectal Musculature
Anterior View



INTERSPHINCTERIC PLANE

The intershincter plane is a potential space found between the two sphincter muscle.It contains 8-12 apocrine glands,it can cause infection,so this plane is important .

PUBORECTALIS

For preservation of continence ,the angle between the anal canal and rectum is important which was mainatained by puborectalis .The puborectalis portion of levatorani and external anal sphincter muscle are closely associated.

ANORECTAL RING

The ring clearly felt digitally,particularly its posterior and lateral aspects .Between the rectum and anal canal it present.Anorectal ring is formed by the deep external sphincter ,the joining of internal sphincter and conjoined longitudinal muscle.

MUCOUS MEMBRANE

The membrane extends through anorectal ring into the anal canal.which was pink columnar epithelium.The upper anal canal mucosa is loosely adherent to the underlying structures ,also it covers the internal rectal plexus.passed downwards as the series of 8-12 longitudinal folds it is called as the column of morgagni ,the mucosa is red in colour and cubical,the mucous membrane becomes plum coloured above the anal valves.below the anal valves abrupt and albeit wavy transition as squamous epithelium .It is ponchmentcolour .The anoderm, which is squamous epithelium lining of the lower anal canal,it is thin and shiny .The difference between the squamous epithelium and the anal skin is,squamous epithelium has no epidermal appendage.

DENTATE LINE

Dentate line represents the site of fusion of postallontoicgut,theproctodermani ,portion of anal canal and remnants of anal papillae situated on the free margin of the anal valves .It is important landmark for surgically and morphologically.

Below - from squamous epithelium

- from spinal nerves(very sensitive)

- from systemic venous system…

Above – cubical epithelium

Autonomicnerves(insensitive)

Portalvenoussystem

WHITE LINE OF HILTON

The middle part or transitional zone of the anal canal (15mm) has a bluish appearancebecause of a dense venous plexus that lies beneath it and muscle coat.The mucosa is less mobile than in the upper part of the anal canal and is referred to as pectin or transitional zone.The lower limit of the pectin often has a whitish appearance because of which it is referred to aswhite line of Hilton.Hilton's line is suited at the level of the interval between the subcutaneous part of external anal sphincter and the lower border of the internal anal sphincter. It marks the lower limit of pectin or stratified squamous epithelium which is thin,pale and glossy and is devoid of sweat Glands.

ANAL VALVES OF BALL

This anal valves presents as series of transversely placed semicircular folds, the columns of margagni.The Valves are functional and remanants of fusion of post allontoic gut with the proctodaeum.They lie along and represents waviness of the dentate line.

CRYPTS MORGAGNI

The anal crypts presents as small pockets and it situated between inferior extremites of morgagni, the most of the crypts posteriorly situated ,by a narrow duct it opens anal gland.

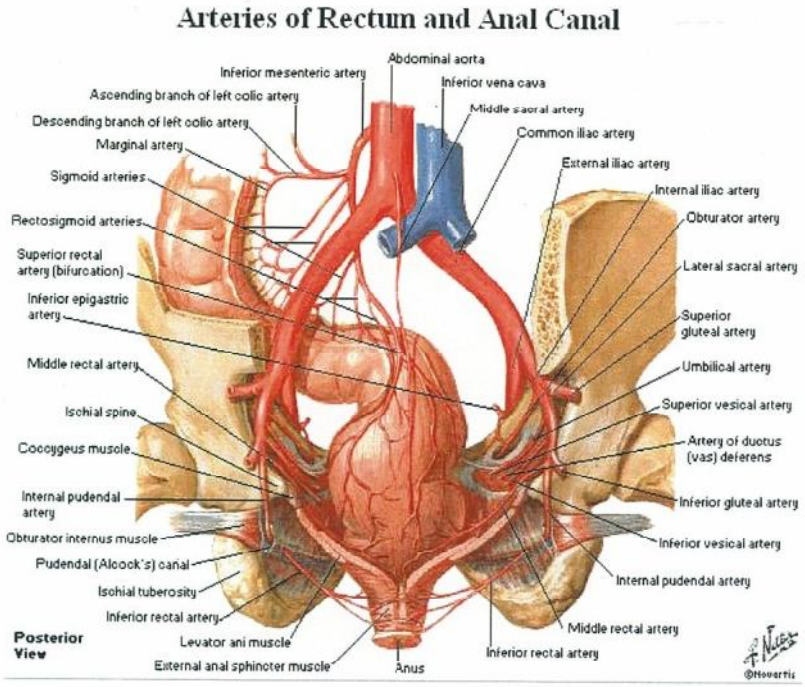
ARTERIAL SUPPLY

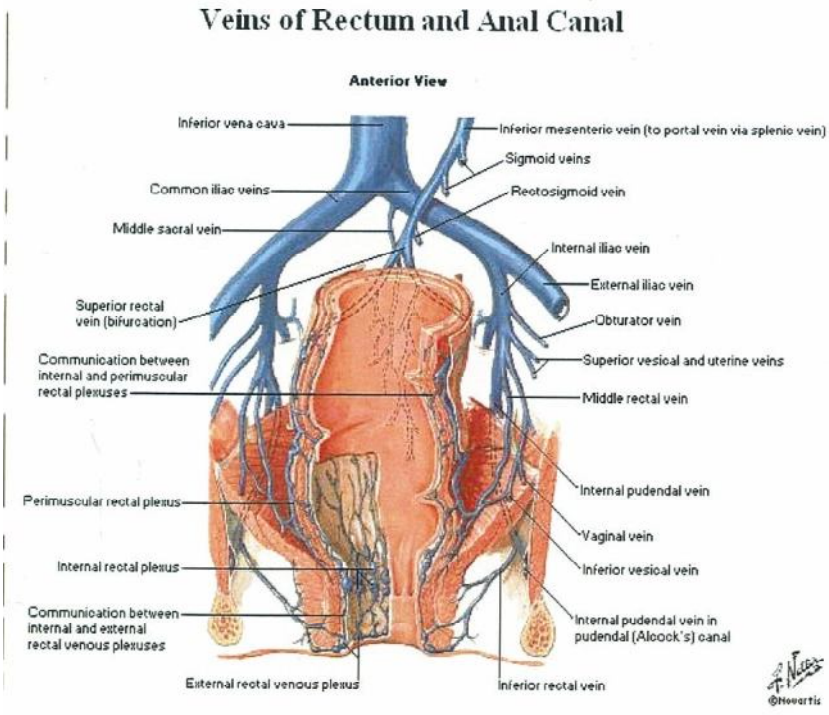
The superior ,middle,inferior hemorroidal arteries are blood supply for the anal canal. The superior branch is the most important branch, which left branch supplies the left portion of the anal canal by a single terminal branch.It has two terminal branches,these arteries are contribute to a rich submucous and intramural plexes.

VENOUS DRAINAGE

The veins of anal canal distributed in a similar as arterial supply .The middle and superior hemorroidal vein drains into inferior mesenteric vein into the portal venous system.The inferiorhemorrhoidal vein drains the lower half of the anal canal,the subcutaneous perianal plexus of veins joined to the external iliac

vein on each side.The superior hemorrhoidal vein drains the upper half of anal canal.





LYMPHATIC DRAINAGE

Lymph from the lower half of the anal canal drains first into the superficial and then into the deep inguinal lymph nodes. Upper half of the anal canal lymph flow upwards into postrectal lymph node,then it goes to para aortic nodes, via inferior mesenteric chain.

INNERVATION OF ANAL CANAL

The internal anal sphincter in tonically contracted through combination of excitatory and inhibitory control mediated by sympathetic and parasympathetic nerves respectively.The former are postganglionic fibres that travel with the hypogastric nerves bilaterally (L1,L2),whereas the latter are derived from the sacral nerves(S2,S3,S4).Distension of the rectal wall results in relaxation of internal sphincter through the recto anal inhibitory reflex.The external sphincter is innervated by pudendal nerve bilaterally which originate from s2,s3.

SENSATION

Free nerve endings can be observed about 1.5cm above the anal valves to the anal verge.Meissner’s corpuscles,Krause’s bulbs,Golgi Mazzoni corpuscles and genital corpuscles respond to touch,cold, pressure and friction,respectively. These sensations are carried by the somatic nerves through the inferior hemorrhoidal branch of pudendal nerve.

SURGICAL SPACES RELATED TO THE ANAL CANAL

1. The submucous space of the Canal lies above the white line between the mucous membrane and the internal sphincter.It contains the internal rectal venous plexus and lymphatics.

2. The perianal space surrounds the anal canal below the white line. It contains subcutaneous external sphincter ,the external rectal venous plexus, and the terminal branches of the inferior rectal vessels and nerves. Pus in this space tends to spread to the anal canal at the white line or to the surface of the perineal skin rather than to the ischiorectal space.

3. The ischiorectal space or fossa is wedge shaped fossa situated on each side of the anal canal below the pelvic diaphragm.Its base is directed downwards,towards the surface,the apex is directed upwards.The mainpurpose of the fossa in to allow distention of the rectum and anal canal during passage of the faces.

Both the perianal and ischiorectal spaces are common sites of abscesses.

BENIGN ANAL DISEASES

HAEMORRHOIDS/PILES
(PILES:latin:BALL)

They are dilated veins occurring in relation to anus. They occur more commonly when intraabdominal pressure is raised(eg: obesity,constipation,pregnancy).Classically they occur in the 3,7, & 11'o' clock positions.

Types:

(i) Internal

(ii) External

(iii) Interno External

Interno external and internal hemorrhoids are formed due to engorged vein as the anal lining descends and is gripped by anal sphincter.In the region of the three terminal branches of the suspension hemorrhoidal artery,the muscosal lining in prominently gathered in this region (anal cushions).During defecation straining causes there cushions to slip down and internal Hemorrhoids develops. There anal cushions are present from embryonic life, it is necessary for full continence.

Symptoms

Bright red painless bleeding , mucous discharge, prolapse,pain only on prolapse.

Complications

Strangulation, thrombosis,ulceration,Gangrene, fibrosis,suppuration, pylephlebitis.

TREATMENT

Symptomatic Treatment:

Active Treatment:

i) Injection Treatment(Mitchell)

ii) Banding Treatment(Barron)

iii) Cryo-surgery

iv) Photocoagulation

Operations:

i) Open hemorrhoidectomy (Milligan – Morgan)

ii) Closed hemorrhoidectomy- Fergusson's

- Park's(Submucous)

iii) Endostaplingtechnique(Longo).

FISTULA IN ANO:

Fistula in Ano usually former by an anorectal abscess which bursts spontaneously on was opened in completely. Fistulous track line by granulation tissue.It connect the Anal canal and superficially on the skin around the anus.

Types:

Two groups depending upon whether internal opening is above or below anorectal ring (ie) high level and low level respectively.

TYPES	STANDARD CLASSIFICATION	PARK'S CLASSIFICATION
SUPERFICIAL	Subcutaneous Low anal	Interspincteric Transphincteric
DEEP	High anal Pelvirectal	Interspincteric Transphincteric Supralevator.

Clinical Features:

Persistantseropurulent discharge.

Goodsall's Rule:

Fistulas with an external opening in relation to posterior halt of the anus, has a curved track may be of horse-shoe type, opens in the midline posterierly and may present with multiple external opening all connected to a single internal opening.

Fistulas with an external opening in relation to the anterior halt of the anus is of direct type.

Treatment:

i) Fistulotomy

ii) Fistulectomy

iii) Seton Suturing

iv) Two staged procedure-colostomy and definitive repair.

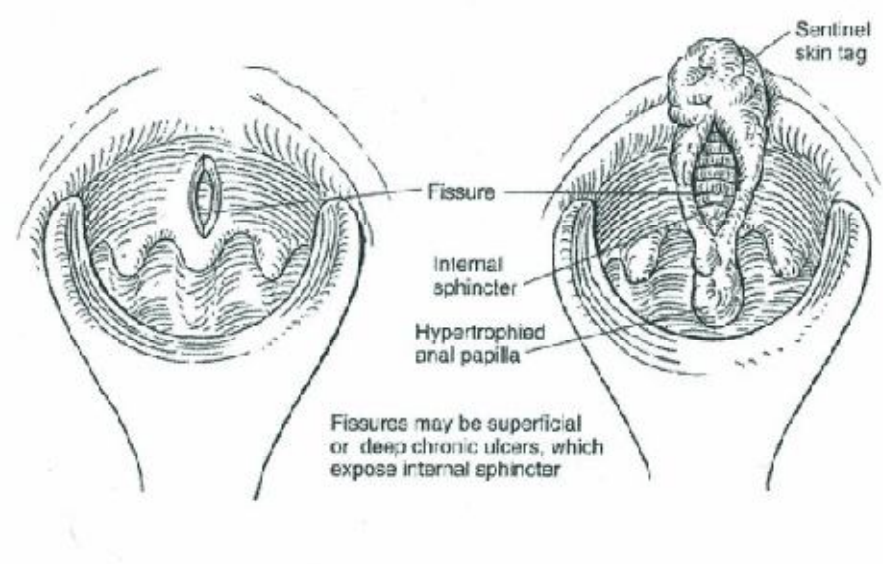
ANAL FISSURES

Anal fissure in defined as linear defect or laceration in the anoderm, located between the dentate line and the anal verge.An acute fissure is a simple laceration where as chronic fissure is defined by these three findings

(i) Visible transverse internal muscle fibers at its base.

(ii) External skin tag

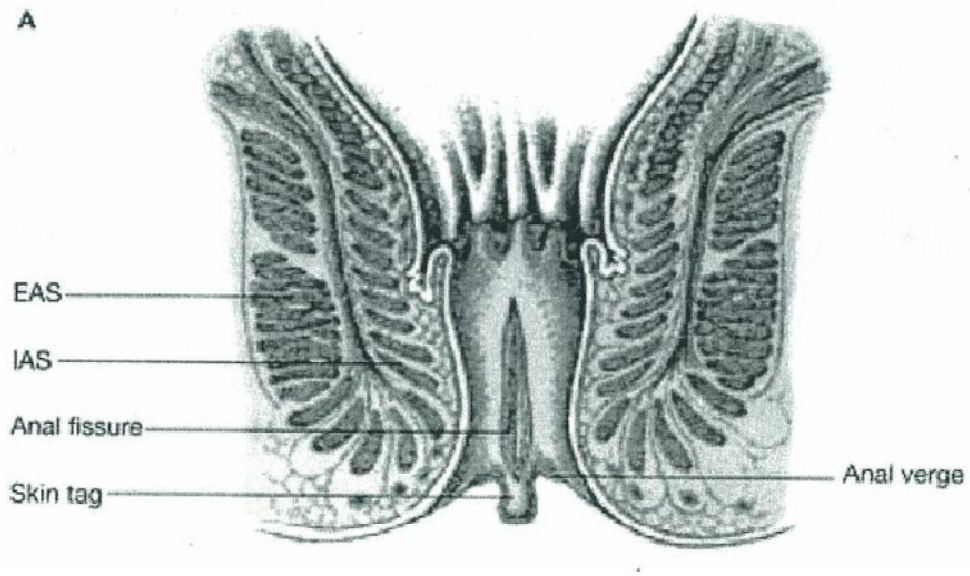
(iii) Hypertrophied papilla



ACUTE ANAL FISSURE

ANAL PRESSURES

The pressure generated in anal canal to keep it closed during periods of inattention or sleep is called resting anal pressure or tone .Approximately half of Normal Resting pressure. Is contributed by the internal sphincter where as the remainder is provided by external spincter and puborectalis.It is called the maximal voluntary squeeze and can only be maintained for a short time.(i.e) more than two times the resting pressure.



FISSURE IN ANO

ETIOLOGY

The causes of fissure in ano are unknown.Primary fissure is often associated. With alteration in bowel habit,particularly an episode of constipation and rarely a repetitive episode of diarrhea.

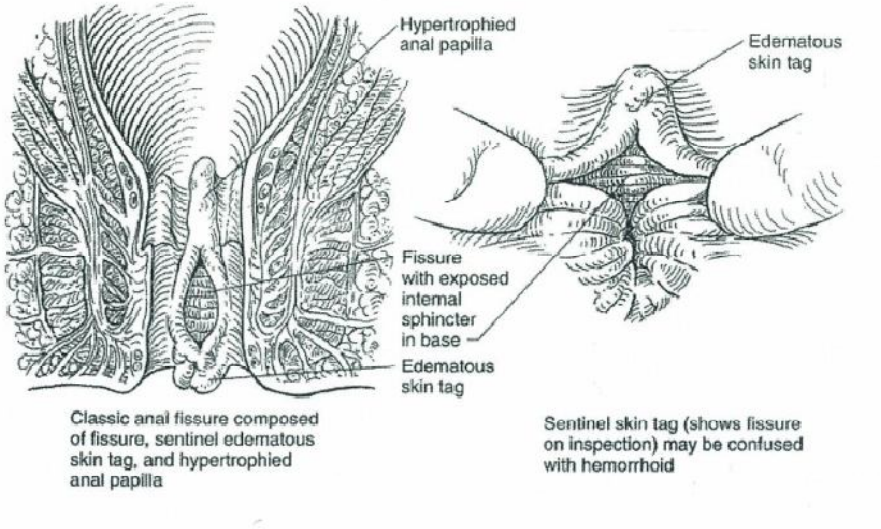
Postpartum fissure may be a result of tearing of anterior aspect of anal canal during birth.

Local trauma is believed to be responsible for the initial skin defect that leads to a boat shaped ulcer resulting in chronic symptoms.

Primary fissure may be acute.If healing does not occur,fissure becomes chronic, in which case the ulcer enlarges in size.

In 10% of chronic fissure,there is a low inter-sphincteric anal fistula communicating between the base of the fissure and dentate line.

Anal fissure is associated with increased resting anal pressure. Motility studies reveal ultraslow waves indicative of increased internal sphincter activity.



SECONDARY FISSURES

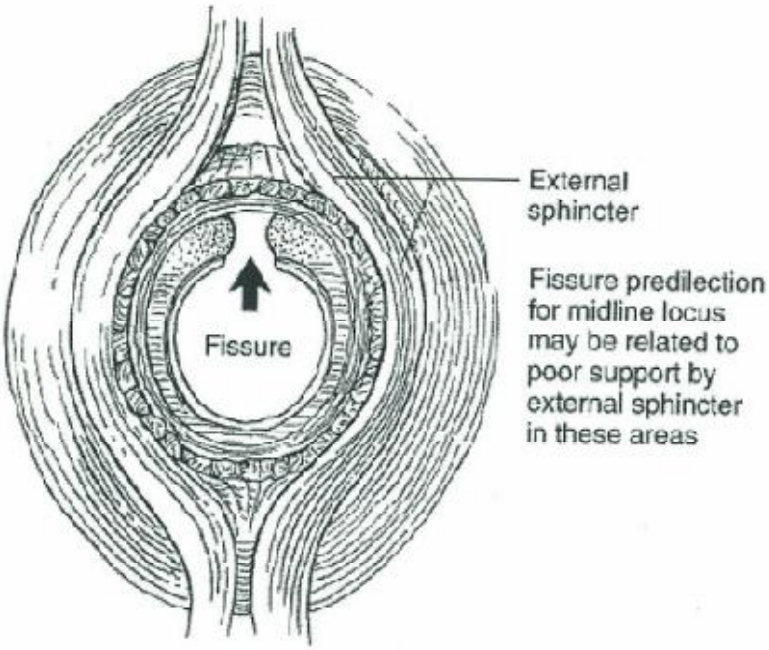
- Crohn's disease,AIDS.
- Infections such as Herpes,Cytomegalovirus,tuberculosis,
- Occassionally as a complication of a previous operation on the anal canal.
- Anal fissures occurring in Crohn's and AIDS are off midline,have shaggy large defects with undermined edges and granulation tissue in the base.
- Crohn's and TB are often painless.
- Anal fissures and ulcer complicating AIDS are often intensely painful and are associated with incontinence and local sepsis.

ACUTE FISSURE IN ANO

TUBERCULOUS ANAL FISSURE

PATHOGENESIS

Because fissures occur most often in the posterior midline, various structural theories have been proposed as causes, the most compelling of which suggests that the vascular anatomy of the internal sphincter may be a factor.



In 1989,Klosterhalfen and associates reported on anatomic dissection that detailed the blood supply of internal hemorroidal artery .In the majority of the cadaver specimens(85%), the posterior commissure of the anal canal was not directly perfused except by end arterioles.More over branching from the sphincter arterioles occur at right angles to the parent vessels and coursed perpendicularly through the fibers of the internal sphincter. These anatomic findings establish the possibility of decreased mucosal perfusion, particularly in the posterior midline. In additions, sphincter spasm or hypertonicity further decreases blood flow.

Schoutten and colleagues have shown increased anal pressures correlated with decreased mucosal blood flow as measured by LASER flowmetry.This vascular –anal resting pressure hypothesis has prompted trials aimed at improving blood flow lowering anal resting pressures.

CLINICAL FEATURES

i) The principal clinical feature is intense anal pain during defecation, often associated with a small amount of bright red bleeding.

ii) Perianal swelling frm skin tag.

iii) Mucous discharge.

iv) Sensation of tearingduring defecation.

v) Dull ache in perineum 3-4 hours after bowel evacuation.

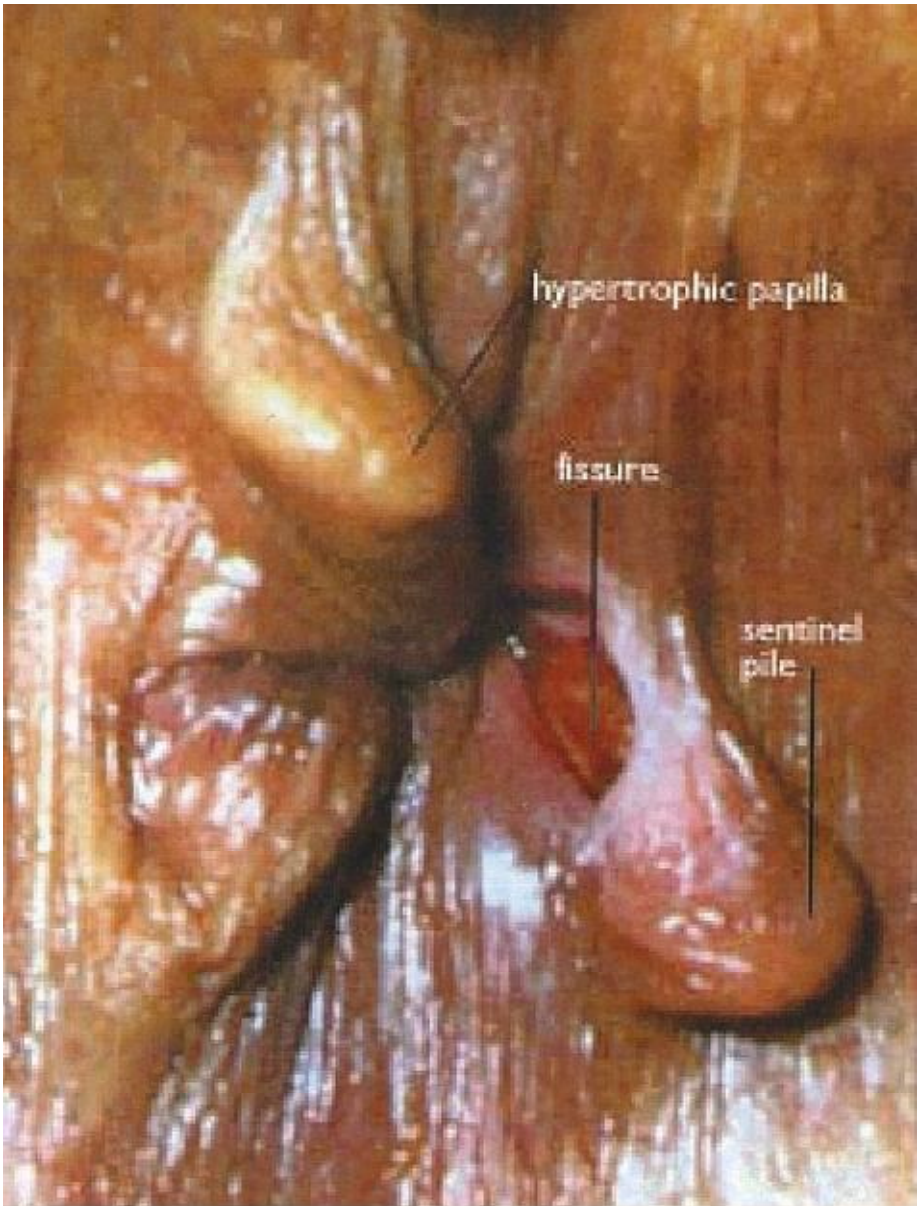
It is exacerbated by a recent episode of constipation and straining or as a complication of a severe diarrhea.

DIAGNOSIS

The diagnosis can usually be achieved by inspection.Gentle parting of the buttocks reveals an edematous skin tag and a shallow anal ulcer usually situated posterior in men or rarely anteriorly in women.Puckering of perianal skin as a result of intense spasm of anal sphincters.

Digital examination is often impossible and should not attempted inpatients with severe pain, because the diagnosis can often be made by inspection.

CHRONIC FISSURE IN ANO



Fissure has edematous margins and is boat shaped with the transverse fibers of the internal sphincter seen at the base of the fissure.

Manometry and digital rectal examination demonstrate increased internal sphincter activity and hypertrophy of distal third of internal anal sphincter.

If anal manometry is done , elevation of resting anal pressure with saw tooth deformity demonstrating contraction of sphincter muscle is pathognomonic.

Motility studies reveal ultraslow waves indicative of increased internal sphincter activity.

Sigmoidoscopy to exclude a primary cause,to exclude any rectal pathologyShould be performed in patients who can tolerate a rectal examination.

CHRONIC FISSURE IN ANO

TREATMENT OUTLINE

Reducing the anal canal pressure medically or by dividing a portion of the-fissure.

Medical therapy of anal fissures should almost always precede surgical therapy.Stool bulking agents such as psyllium seeds or methylcellulose in quantities sufficient to provide bulky soft stools reliably are the mainstay of medical therapy.Stool softeners and other laxatives should be avoided as the resultant stool is soft it does not dilate the anal canal.

Dilute nitroglycerine 0.2% ointment applied to the anus before and after bowel movements has been advocated as an adjunt to bulking agents to decrease pain and to promote healing.

Persistence of painful anal fissures for 6 weeks or more on good medical therapy or development of complication such as infection constitute an indication for surgical therapy.

HEAT/SITZ BATH

The mechanism by which heat relieves discomfort is perhaps by lowering anal canal pressures. Nevertheless,heat provides dramatic relief to most patients with acute chronic fissures.It should be used in all patients.

TOPICAL NITROGLYCERINE

Organic nitrates are rapidly denitrated enzymatically in the smooth muscle to release Free radical nitric oxide(NO) – increased cGM P-Dephosphorylation of myosin light chain kinase(MLCK) through a cGMPdependant protein kinease.

Reduced availability of phosphorylated/active MLCK interfaces with actin to cause contraction .Consequently relaxation occurs. Raised intracellular cGMP may also reduce Ca^{2+}entry –contributing to relaxation.

0.2% GLYCERYL TRINITRATE OINTMENT

SIDE EFFECTS

Headache(relieved by simple analgesics) Tachyphylaxis which can be reduced by instructing the patients to rest lying down while applying the ointment.

OTHER TOPICAL AGENTS

Both oral and topical Diltiazem have also been used to heal fissure and may have fewer side effects than nitrates.

Newer agents such an arginine (a nitric oxide donor) and topical Bethanecol (a muscarinic agonist)have also been tried to treatfissures.

BOTULNUM TOXIN

Temporary musculas paralysis caused by Botulnum Toxin,It's mechanism of action is preventing acetyl choline release from presynaptic nerve terminals. This method is an alternative method for surgical sphinctertomy in chronic fissure. Advantage is superior to other medical the treatment. Disadvantage is healing slaver than other method.Recurrance is more common.

20 units of type A Botulinum toxin diluted to 50 units/ml is injected b/l into the fissure. It is well tolerated and can be administered on an outpatient basis.The healing rate reported is about 79%.

Drawback is the toxicity of the drug

Accidental injection into surrounding tissues amounting to general poisoning, hemotona and infection reported had discouraged regular use of this therapy.

BOTULINUM TOXIN INJECTION

CARBON DI-OXIDE LASER SURGERY

It involves laser vaporization of the fissure locally.The internal sphincter can be incised using this LASER.In long standing fissures,there is some degree of anal stenosis.It can be used to give relieving incisions in the three quadrants other than the fissure before the fissure is attended.

SURGERIES FOR ANAL FISSURE

OPERATIVE STRATEGY

Accurate identification of the lower border of the internal sphincter is essential to successful completion of an internal spincterotomy.

A bivalve speculum is inserted into the anal canal (eg.Park's retractor)and is opened for a distance of about 2 finger breadths to place the internal sphincter on stretch.

Adistinct groove between subcutaneous external sphincter and lower borders of the internal sphincter is felt.

PREOPERATIVE PREPARATION:

Many patients with anal fissure cannot tolerate a preoperative enema because of excessive pain. Consequently, a mild cathartic, the night before the operation constitutes the only preoperative care necessary.

LATERAL INTERNAL SPHINCTEROTOMY:

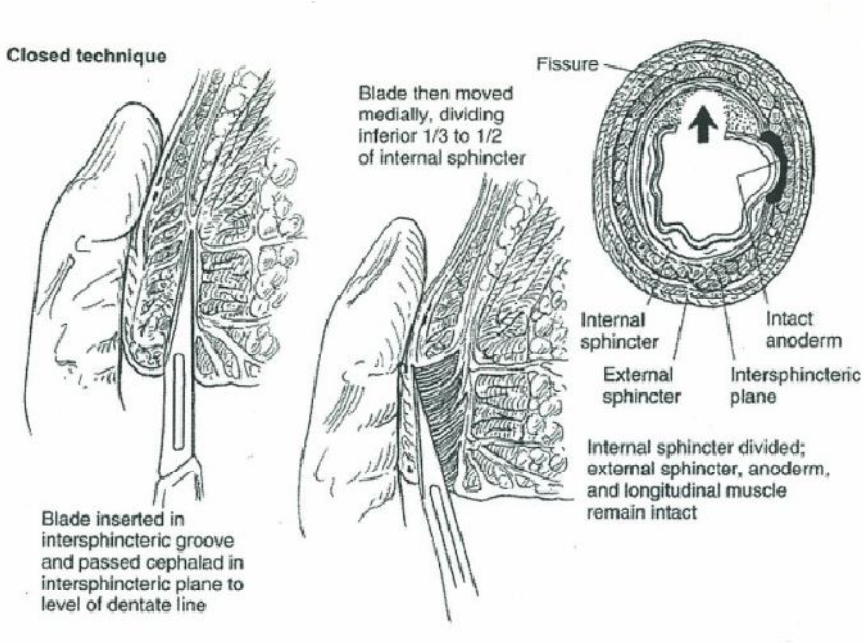
Two methods (i) Closed.

(ii)Open.

CLOSED SPHINCTEROTOMY

- Pt placed in lithotomy position.
- Groove between the two sphincters is felt by the method before mentioned.
- A No.11 scalpel blade is inserted in this groove keeping the flat portion parallel to internal sphincter up to the level of dentate line (1.5cm from anal verge).Then the internal sphincter is tranected with a gentle sawing motion.
- There is a gritty sensation while it is being transected, followed by a sudden ‘give’,where the blade has reached the mucosa adjacent to the surgeon’s left index finger, inserted into the anal canal.

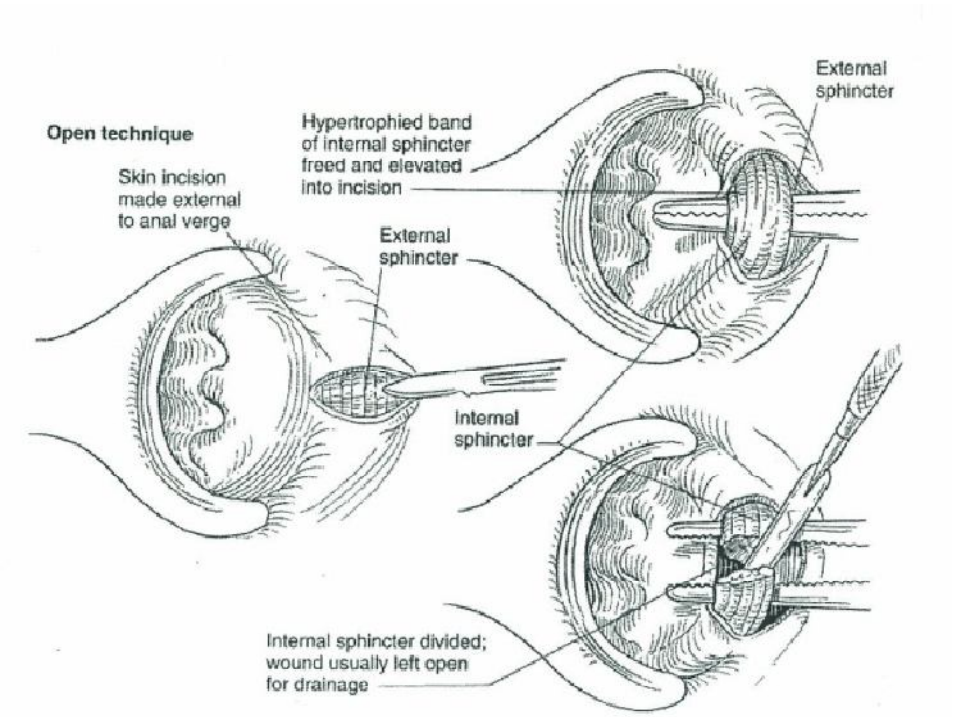
CLOSED INTERNAL SPHINCTEROTMY



OPEN SPHINTEROTOMY

Radial incision is made in the anoderm just distal to the dentate line and is carried across the lower border of the internal sphincter and the intersphincteric groove are identified.. The fibres of internal sphincter have a whitish hue. The lower portion of internal sphincter is divided up to a point level with the dentate line. Hemostasis is achieved with aeletrocautery.Dressing in applied.

OPEN INTERNAL SPHINCTEROTOMY



COMPLICATIONS

- Hematoma/Bleeding (Rare).
- Perianal abscess(Rare).
- Flatus and fecal soiling.
- Flatus incontinence(temporary).

ANAL DILATATION

- Pt anesthetized in left lateral position.
- A gentle dilatation is undertaken initially using two fingers and slowly stretching the anal canal to accommodate four fingers.
- A circumferential movement in required, so that dilatation is directed to all parts of the internal sphincter muscle.
- This procedure should be performed for 2 to 3 minutes.
- Forceful dilatation should be avoided.This is an uncontrolled disruption that is associated with a higher recurrence rate and incontinence and hence is discouraged.

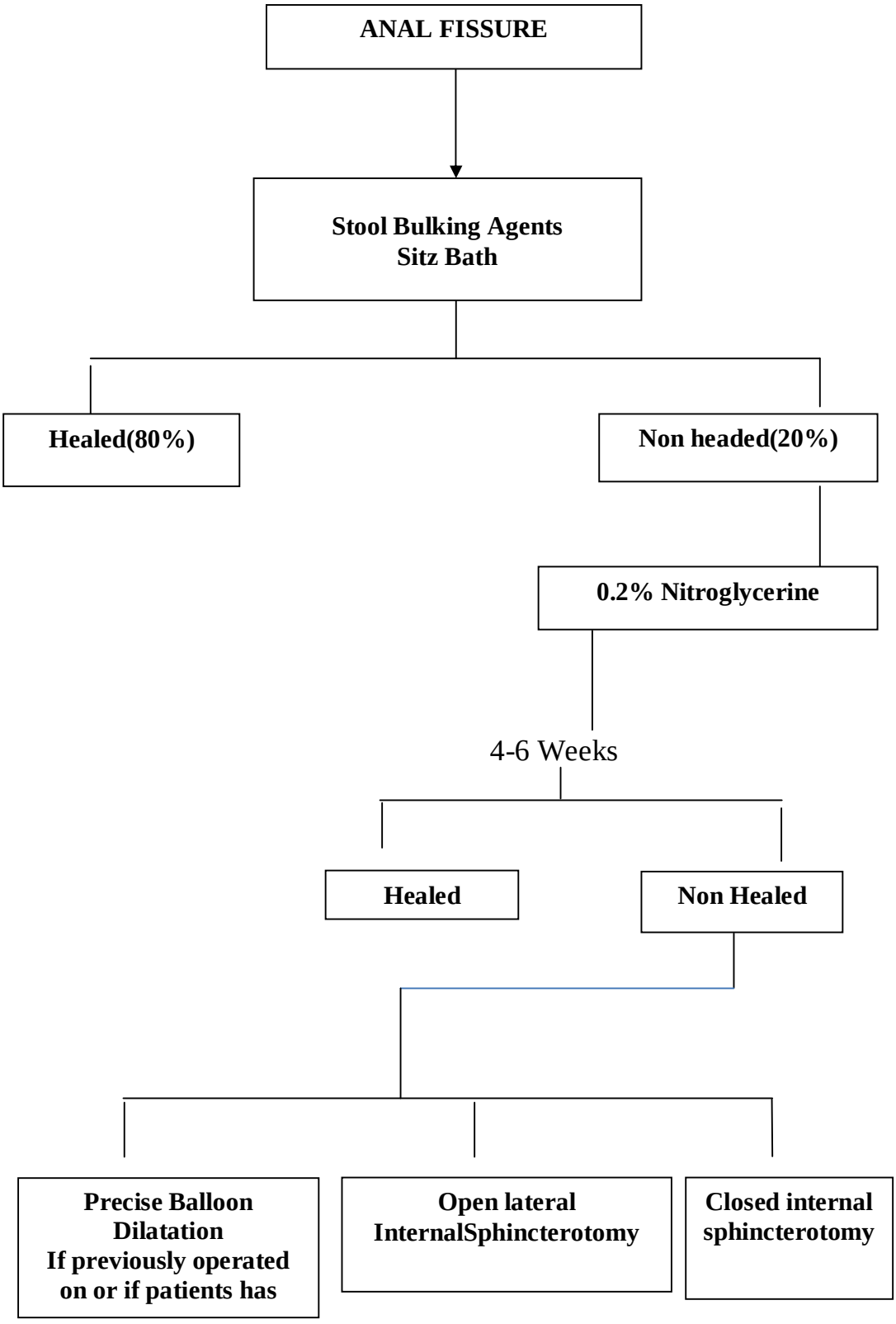
ANORECTAL ADVANCEMENT FLAP:

It is particularly attractive for patients with low anal pressures,that is those who have failed previous sphincterotomy, despite a postoperative lowering of anal pressure and for those with severe anal stenosis.

BALLOON DILATATION

Sohn and colleagues have reported that controlled, precise dilatation of the anal canal using a balloon tipped dilating catheter is as efficacious as lateral internal sphincterotomy but lacks the typical complication associated with this operation .Although controversial and not prospectively studied, balloon dilatation for patients for whom stool bucking agents, heat and nitroglycerine fail may be indicated before a lateral anal sphincterotomy is performed,especially in patients who may have sphincter mechanisms at risk of feal incontinence.

The most practical and safest approach to the treatment of patients with anal fissure is depicted in the algorithm.


ANAL FISSURE
Stool Bulking Agents
Sitz Bath
Healed(80%)
Non headed(20%)
0.2% Nitroglycerine
4-6 Weeks
Healed
Non Healed
Precise Balloon Dilatation
If previously operated on or if patients has
Open lateral InternalSphincterotomy
Closed internal sphincterotomy

MATERIALS AND METHODS

SETTING

Study was a prospective comparative study done in Government Kilpauk Medical College Hospital from January 2015 to June 2015. The Study Population was divided into two groups.The Patients were of age group 18-60 years. 100 cases were studied.

STUDY POPULATION

The study population was divided into two groups of 50 patients each.

One study group was treated with topical application of 0.2% Glyceryltrinitrate along with sitz bath.

Oral antibiotics such as Cap Amoxycillin 500 mg BD and Tab. Metronidazole 400 mg TDS for the first 1 week along with topical 0.2% Glyceryltrinitrate application about the size of a pea, over the anal verge thrice daily for a period of 4 weeks and observed.

Another study group was admitted in the ward and taken up for lateral anal sphincterotomy under antibiotic over and a preoperative plain water enema.

The results were analyzed and published.

OBSERVATION AND ANALYSIS

SEX INCIDENCE

The incidence of fissure is slightly higher in females than males.

Out of the 100 cases studied ,56 patients were females and 44 patients were males.

Thus the sex incidence ratio in this study is 1.2:1 in favour of females.

P value - ≤ .01 Highly significant

Pvalue - ≥ .05 No significant

TABLE 1

			GROUPS		Total
			SURGICAL	CHEMICAL	
GENDER	F	Count	28	28	56
		% within GROUPS	56.0%	56.0%	56.0%
	M	Count	22	22	44
		% within GROUPS	44.0%	44.0%	44.0%
Total		Count	50	50	100
		% within GROUPS	100.0%	100.0%	100.0%

	SURGICAL	CHEMICAL
Female	28	28
Male	22	22

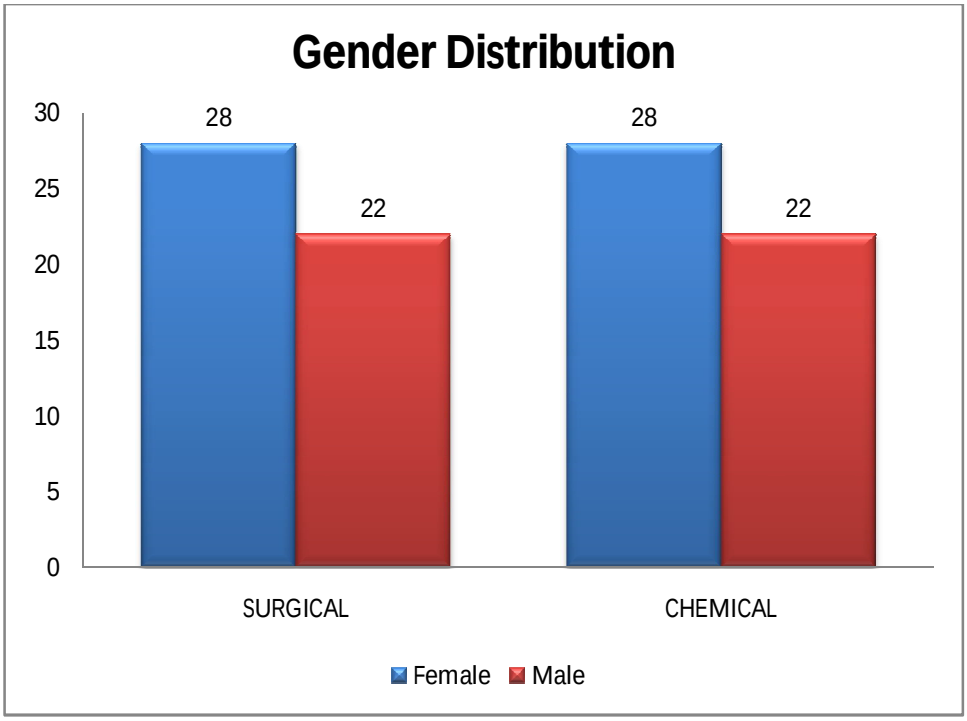
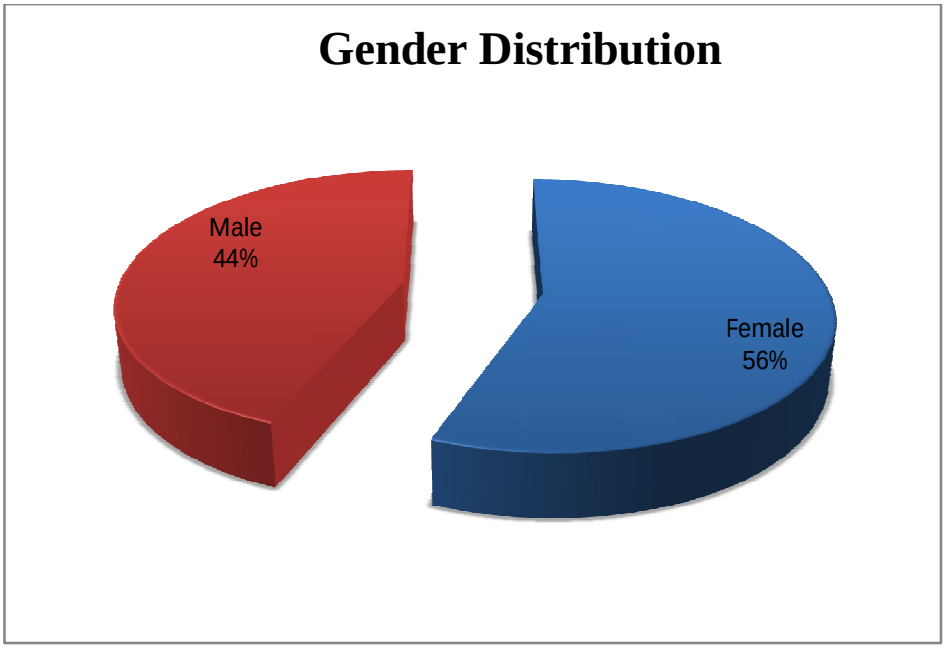

Gender Distribution
30
25
20
15
10
5
0
28
22
28
22
SURGICAL
CHEMICAL
Female
Male

TABLE 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	56	56.0	56.0	56.0
	Male	44	44.0	44.0	100.0
	Total	100	100.0	100.0	



P value is 1.00 no significant

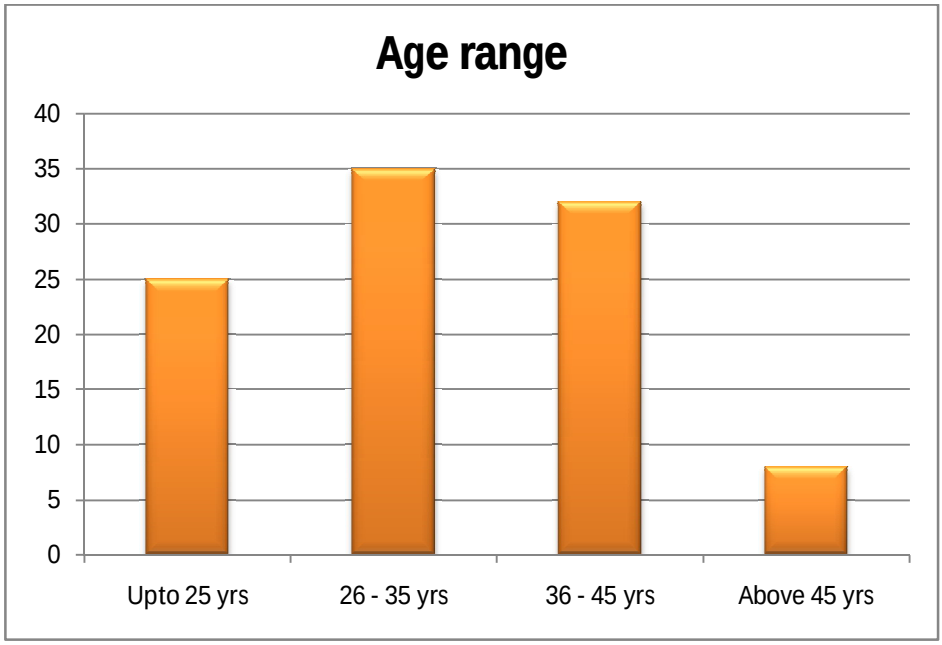
AGE INCIDENCE

The occurrence of fissure in ano in various age groups in my study are as follows.

TABLE 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Upto 25 yrs	25	25.0	25.0	25.0
	26 - 35 yrs	35	35.0	35.0	60.0
	36 - 45 yrs	32	32.0	32.0	92.0
	Above 45 yrs	8	8.0	8.0	100.0
	Total	100	100.0	100.0	

Thus the fissure is more in 26-35 years (i.e) young adults in my study.



P value is .389 no significant

CLINICAL PRESENTATION

The most common clinical presentation is painful defecation occurring in 92 of 100 patients.

The other presentations are:

Bleeding PR – 82 patients

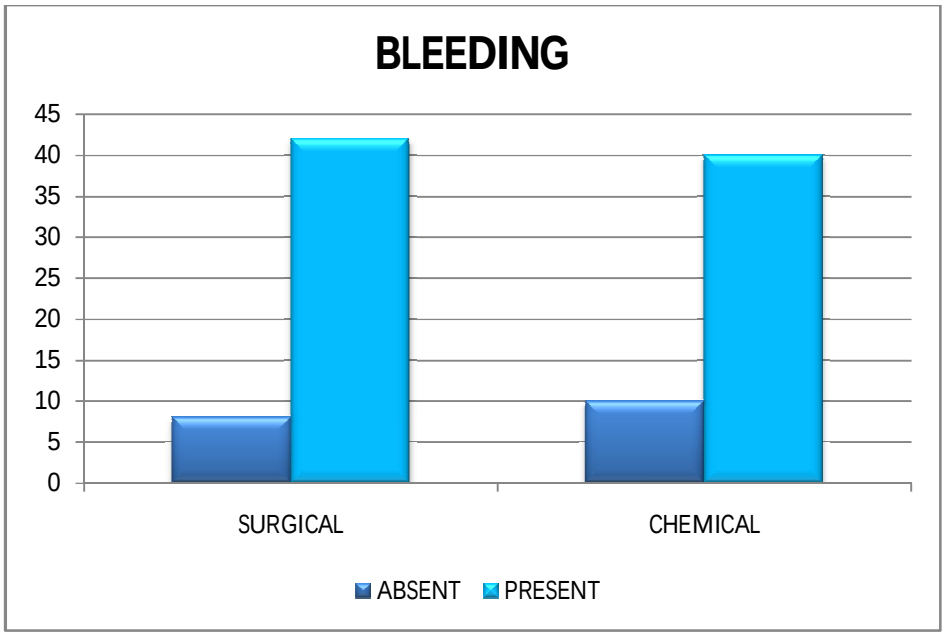
Pruritus ano – 6 patients

BLEEDING

TABLE 4

			GROUPS		Total
			SURGICAL	CHEMICAL	
BLEEDING	ABSENT	Count	8	10	18
		% within GROUPS	16.0%	20.0%	18.0%
	PRESENT	Count	42	40	82
		% within GROUPS	84.0%	80.0%	82.0%
Total		Count	50	50	100
		% within GROUPS	100.0%	100.0%	100.0%

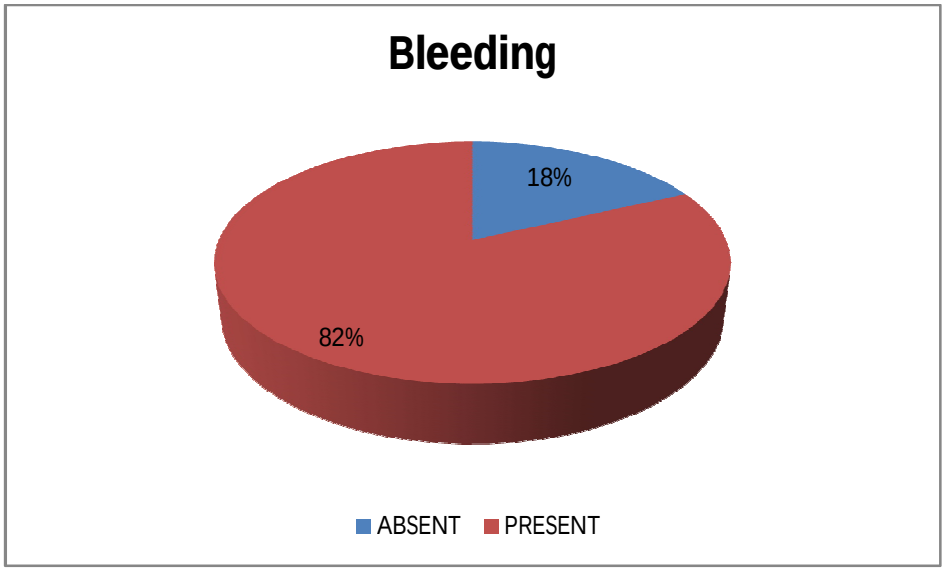
	SURGICAL	CHEMICAL
ABSENT	8	10
PRESENT	42	40


BLEEDING
45
40
35
30
25
20
15
10
5
0
SURGICAL
CHEMICAL
ABSENT
PRESENT

BLEEDING

TABLE 5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	18	18.0	18.0	18.0
	PRESENT	82	82.0	82.0	100.0
	Total	100	100.0	100.0	

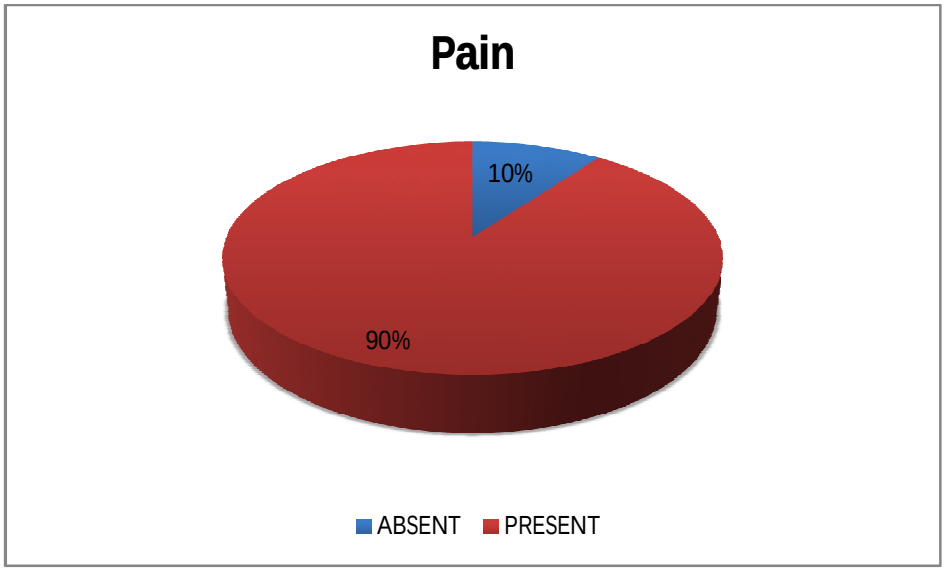


P value is .603 no significant

PAIN

TABLE 6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	10	10.0	10.0	10.0
	PRESENT	90	90.0	90.0	100.0
	Total	100	100.0	100.0	



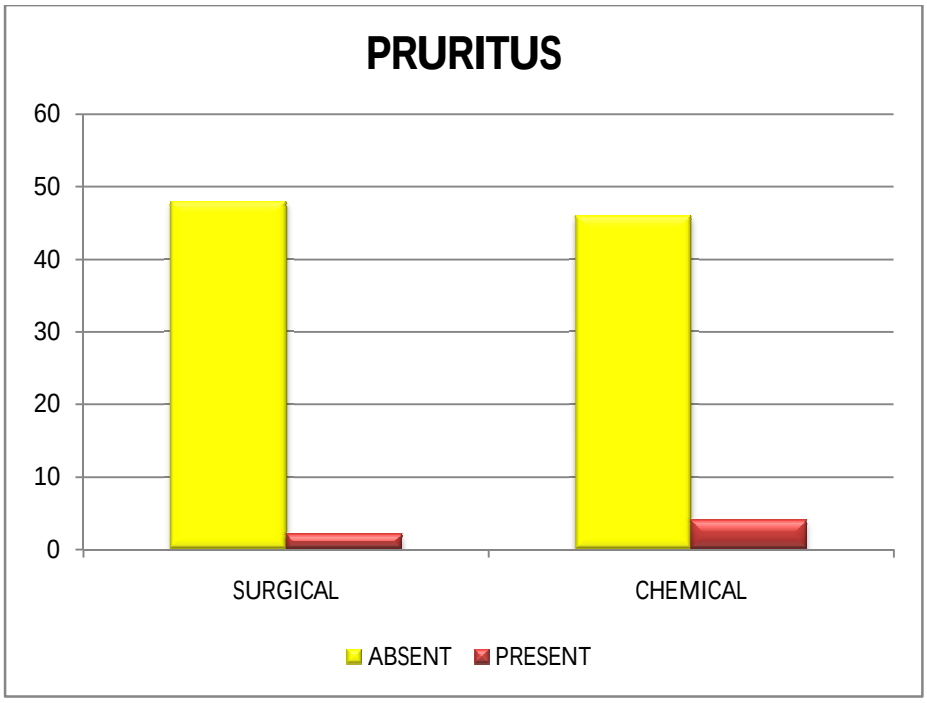
P value is 1.00 no significant

PRURITUS

TABLE 7

			GROUPS		Total
			SURGICAL	CHEMICAL	
PRURITUS	ABSENT	Count	48	46	94
		% within GROUPS	96.0%	92.0%	94.0%
	PRESENT	Count	2	4	6
		% within GROUPS	4.0%	8.0%	6.0%
Total		Count	50	50	100
		% within GROUPS	100.0%	100.0%	100.0%

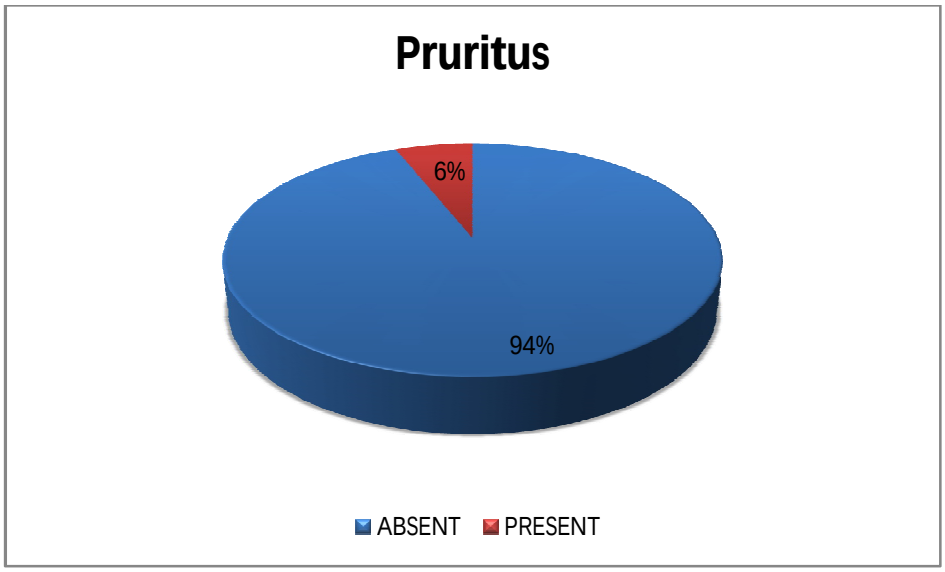
	SURGICAL	CHEMICAL
ABSENT	48	46
PRESENT	2	4


PRURITUS
60
50
40
30
20
10
0
SURGICAL
CHEMICAL
ABSENT
PRESENT

PRUITUS

TABLE8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ABSENT	94	94.0	94.0	94.0
	PRESENT	6	6.0	6.0	100.0
	Total	100	100.0	100.0	



P value is .4000 no significant

TYPES OF FISSURE

Incidence of various type of fissure is as follows:

Acute fissure - 49 patients.

Chronic fissure - 51 patients.

N.B Acute fissure is a simple laceration of anoderm whereas chronic fissure in characterized by these three features:

i) Visibility of transverse internal sphincter fibres at the base of the ulcer.

ii) Sentinel skin tag and

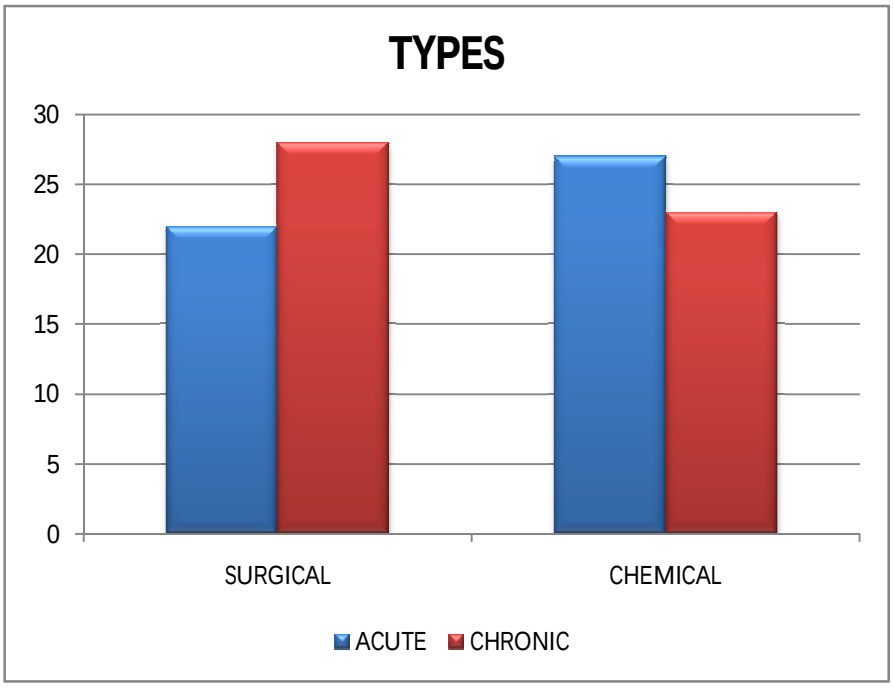
iii) Hypertrophied anal papilla

TYPES

TABLE9

			GROUPS		Total
			SURGICAL	**CHEMICAL**	
TYPES	ACUTE	Count	22	27	49
		% within GROUPS	44.0%	54.0%	49.0%
	CHRONIC	Count	28	23	51
		% within GROUPS	56.0%	46.0%	51.0%
Total		Count	50	50	100
		% within GROUPS	100.0%	100.0%	100.0%

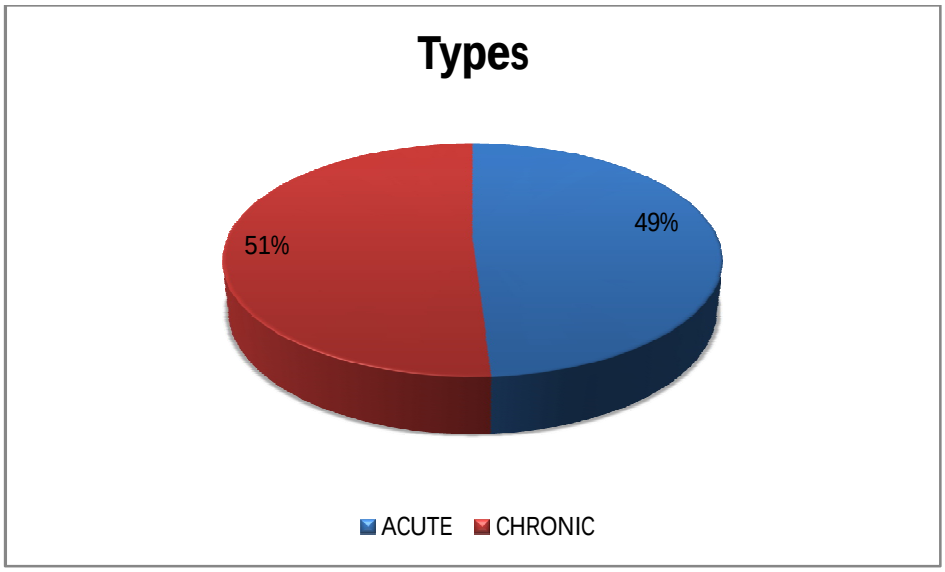
	SURGICAL	CHEMICAL
ACUTE	22	27
CHRONIC	28	23


TYPES
30
25
20
15
10
5
0
SURGICAL
CHEMICAL
ACUTE
CHRONIC

TYPES

TABLE10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACUTE	49	49.0	49.0	49.0
	CHRONIC	51	51.0	51.0	100.0
	Total	100	100.0	100.0	



P value is .317 no significant

LOCATION OF FISSURE IN ANO:

The most common location of fissure in ano is the posterior midline.

86 out of 100 patients showed fissure in the posterior midline.

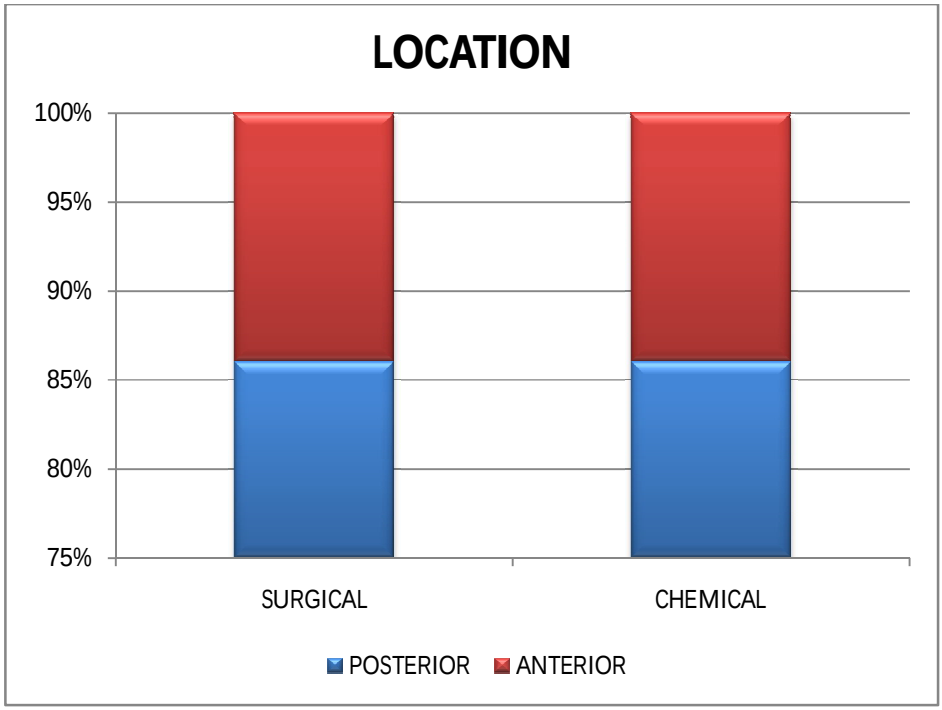
Only 14 patients had anterior midline fissures.Of these, all patients were females.

LOCATION

TABLE 10

			GROUPS		Total
			SURGICAL	CHEMICAL	
LOCATION	POSTERIOR	Count	43	43	86
		% within GROUPS	86.0%	86.0%	86.0%
	ANTERIOR	Count	7	7	14
		% within GROUPS	14.0%	14.0%	14.0%
Total		Count	50	50	100
		% within GROUPS	100.0%	100.0%	100.0%

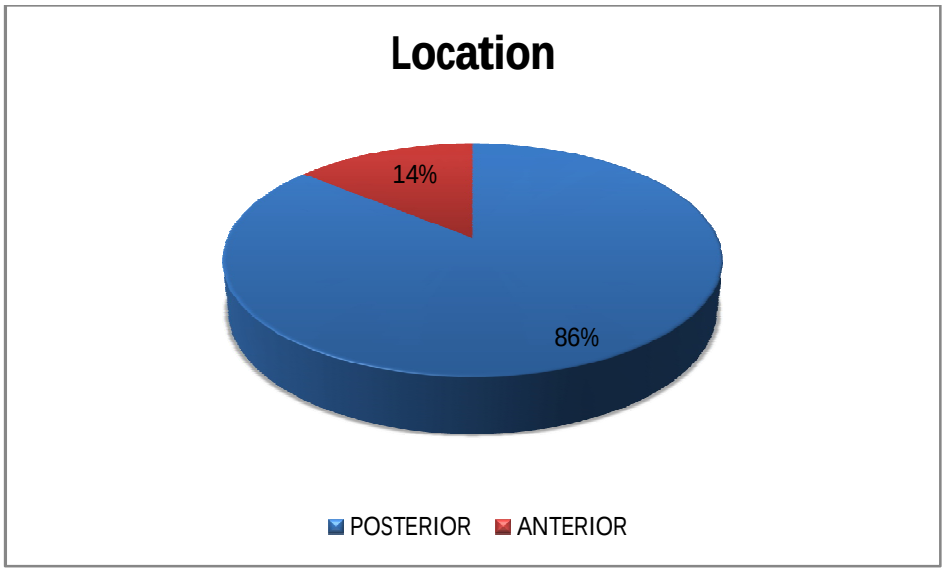
	SURGICAL	**CHEMICAL**
POSTERIOR	43	43
ANTERIOR	7	7


LOCATION
100%
95%
90%
85%
80%
75%
SURGICAL
CHEMICAL
POSTERIOR
ANTERIOR

LOCATION

TABLE 11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	POSTERIOR	86	86.0	86.0	86.0
	ANTERIOR	14	14.0	14.0	100.0
	Total	100	100.0	100.0	



P value is 1.000 no significant

EFFECTIVENESS OF SURGICAL SPHINCTEROTOMY:

Lateral anal sphincterotomy either by closed or open method, relieved almost all the patients .50 patients who were subjected to this method demonstrated healing of fissures.

Regarding postoperative complications,

(i) 8 out of 50 patients had postoperative pain relived by analgesics(i.e.,) 16%.

(ii) Urinary retention was present in 3 patients(i.e.,)6%.

(iii) Transient flauts incontinence in 2 patients(i.e.,)4%.

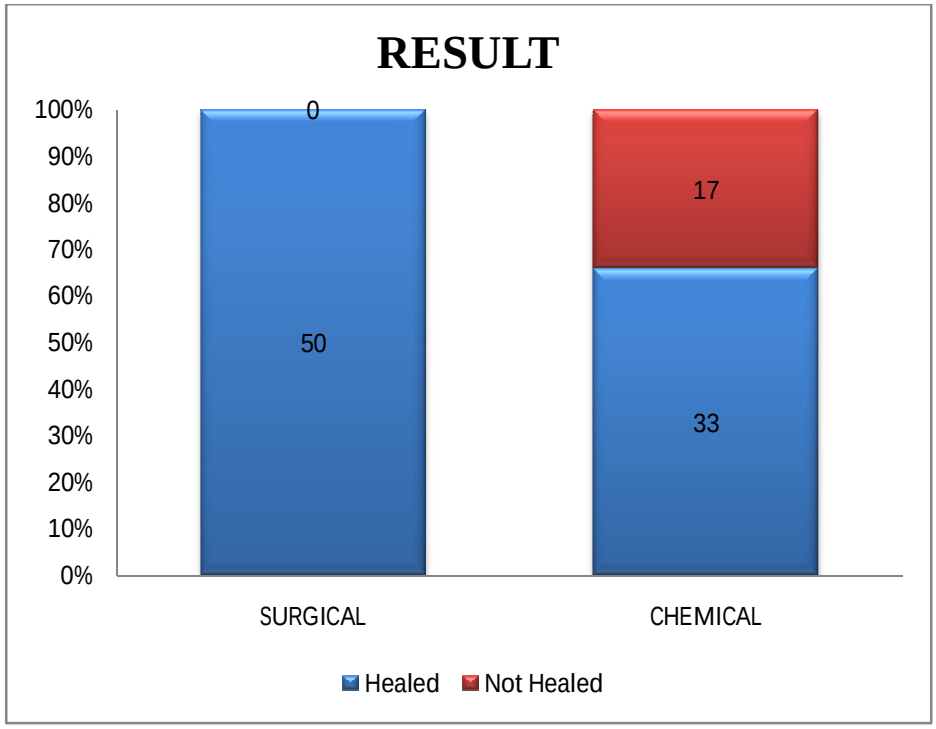
(iv) Bleeding was not noted in any patient.

RESULT

TABLE12

			GROUPS		Total
			SURGICAL	CHEMICAL	
RESULT	Healed	Count	50	33	83
		% within GROUPS	100.0%	66.0%	83.0%
	Not Healed	Count	0	17	17
		% within GROUPS	0.0%	34.0%	17.0%
Total		Count	50	50	100
		% within GROUPS	100.0%	100.0%	100.0%

	SURGICAL	CHEMICAL
Healed	50	33
Not Healed	0	17


RESULT
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
50
17
33
SURGICAL
CHEMICAL
Healed
Not Healed

POSTOPERATIVE COMPLICATIONS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO C/SE	77	77.0	77.0	77.0
	PAIN	8	8.0	8.0	85.0
	TFI	3	3.0	3.0	88.0
	HEADACHE	12	12.0	12.0	100.0
	Total	100	100.0	100.0	

EFFECTIVENESS OF CHEMICAL SPHINCTEROTOMY

Out of 50 patients (27 patients – acute, 23 patients- chronic)who under went chemical sphincterotomy with topical application of 0.2% glyceryltrinitrate thrice daily for four weeks along with high fibre diet , sitzbath,oral one week antibiotic course,32 patients showed symptomatic relief and healing.

SIDE EFFECTS OF CHEMICAL SPHINCTEROTOMY

Most prominent side effect of topical 0.2% Glyceryltrinitrate application is headache (i.e) was present in 12 out of patients (i.e.,) 24% which was tolerable and relieved by simple analgesics.

CONCLUSION

- The fissure in ano has a slight female preponderance.The sex incidence ratio is 1.2:1 in favour of females.

- The fissure is ano occurs more commonly in 3rd decade (ie) young adults.

- The most common clinical presentation of fissure in ano is painful defecation,which occurs is 90 out of 100 patients studied.

- The incidence of both acute and chronic fissures were almost the same.

- The most common location of fissure is posterior midline.86 out of 100 patients showed fissure in the posterior midline .Only 14 patients had anterior midline fissure . Of these all were females.

- Surgery in the form of open or closed lateral anal sphincterotomy forms the definitive treatment , healing fissure in almost all patients with very few postoperative complications.

- Chemical sphincterotomy (ie) topical application of 0.2% Glyceryltrinitrate healed 33 out of 50 patients (i.e) 64% efficacy rate.

- The most promment side effect of topical application of 0.2% Glyceryltrinitrate, (ie) headache was present in 24% and was tolerable and relieved by simple analgesics.

- Hence topical application of 0.2% Glyceryltrinitrate can be established as the first line treatment of acute and chronic and fissures.

MASTER CHART

GROUP OF PATIENTS WHO HAVE UN DERGONE SURGICAL SPHINCTEROMY

SI NO	NAME	AGE	SEX	HOS No	Clinical Presentation			Types	Location	Complication	
					Pain	Bleading	Pruritus	Acute	Anterior	Pain	Transient flauts incontine nce
								chronic	Posterior		
1	Sathya	26	F	1619	+	+	-	Acute	Anterior	-	-
2	Navin	24	M	1734	+	+	-	Acute	Posterior	+	-
3	Jayapradha	25	F	2576	+	+	-	Chronic	Posterior	-	-
4	Nagaraj	21	M	2650	+	+	-	Chronic	Posterior	-	+
5	Gopi	40	M	3123	+	+	-	Acute	Posterior	-	-
6	Sulochana	50	F	3131	+	+	-	Chronic	Posterior	-	-
7	Anguthai	46	F	3133	-	+	-	Chronic	Posterior	+	-
8	Devarajan	45	M	3385	+	-	-	Chronic	Posterior	-	+
9	Ravi	35	M	3230	+	+	-	Chronic	Posterior	-	-
10	Amudha	45	F	4496	+	+	-	Acute	Posterior	+	-
11	Vasantha	21	F	4468	+	+	-	Chronic	Posterior	-	-
12	Saidanabee	28	F	4889	+	+	-	Acute	Posterior	+	-
13	Jeeva	36	F	5865	+	-	-	Acute	Anterior	-	-
14	Kowsalya	30	F	6178	+	+	-	Chronic	Posterior	-	-
15	Sureshkumar	21	M	7090	-	+	-	Acute	Posterior	-	-
16	Priyadharshini	30	F	7567	+	+	-	Acute	Posterior	-	-
17	Thirugnanam	20	M	7672	+	-	-	Chronic	Posterior	-	-
18	Rajesh	38	M	7842	+	+	-	Acute	Posterior	-	-
19	Selvi	28	F	8121	+	+	-	Chronic	Posterior	-	-
20	Bagyalakshmi	26	F	8546	+	+	-	Acute	Posterior	+	` -

SI NO	NAME	AGE	SEX	HOS No	Clinical Presentation			Types	Location	Complication			Result
								Acute	Anterior				
					Pain	Bleading	Pruritus	chronic	Posterior	Pain	Transient flauts incontinence	Urinary Retention	
21	Shanthi	33	F	8583	+	+	-	Acute	Posterior	-	-	-	Healed
22	Mathialagan	33	M	9039	-	+	-	Chronic	Posterior	+	-	-	Healed
23	Mariyam	42	F	9624	+	+	-	Chronic	Posterior	-	-	-	Healed
24	Anandhi	35	F	9686	+	-	-	Chronic	Posterior	-	-	-	Healed
25	Murugadoss	33	M	9968	+	+	-	Acute	Posterior	-	-	-	Healed
26	Arulmani	21	M	10603	+	+	-	Chronic	Posterior	-	-	-	Healed
27	Peter	30	M	11007	-	-	-	Acute	Posterior	-	-	-	Healed
28	Meena	21	F	11760	+	+	-	Chronic	Posterior	-	-	-	Healed
29	Palanikumar	31	M	11786	+	-	-	Chronic	Anterior	+	-	-	Healed
30	Malliga	25	F	11821	++	+	-	Acute	Anterior	-	-	-	Healed
31	Vasanthi	44	F	12169	+	+	-	Chronic	Posterior	-	-	-	Healed
32	Shanthi	40	F	12628	+	+	-	Chronic	Posterior	-	-	-	Healed
33	Ramesh	25	M	13239	+	+	-	Acute	Posterior	-	-	-	Healed
34	Lakshmi	30	F	14155	+	+	-	Chronic	Anterior	-	-	-	Healed
35	Sundarathi	24	F	14175	+	+	-	Acute	Posterior	-	-	-	Healed
36	Govindraj	43	M	15439	+	+	-	Chronic	Posterior	-	+	-	Healed
37	Ramesh	45	M	15499	+	+	-	Chronic	Posterior	-	-	-	Healed
38	Dhanam	35	F	19954	+	+	-	Acute	Posterior	-	-	-	Healed
39	Bagyalakshmi	22	F	20450	+	+	-	Chronic	Posterior	-	-	-	Healed
40	Vasanthi	25	F	20909	+	+	-	Acute	Posterior	-	` -	-	Healed

SI NO	NAME	AGE	SEX	HOS No	Clinical Presentation			Types	Location	Complication			Result
					Pain	Bleading	Pruritus	Acute	Anterior	Pain	Transient flauts incontine	Urinary Retentio	
								chronic	Posterior				
41	Sudha	23	F	26370	+	+	-	Acute	Posterior	+	-	-	Healed
42	Kumari	40	F	26367	-	+	+	Chronic	Posterior	-	-	-	Healed
43	Ayyammal	55	F	26382	+	+	-	Chronic	Posterior	-	-	-	Healed
44	Mani	37	M	27666	+	-	-	Chronic	Posterior	-	-	-	Healed
45	Patchiyammal	36	F	28117	+	-	-	Chronic	Posterior	-	-	-	Healed
46	Sathish	26	M	34058	+	+	-	Acute	Posterior	-	-	-	Healed
47	Raja	25	M	36273	+	+	+	Acute	Posterior	-	-	-	Healed
48	ShahulHameed	55	M	36721	+	+	-	Chronic	Posterior	-	-	-	Healed
49	Antony	23	M	37160	+	+	-	Acute	Anterior	-	-	-	Healed
50	Mani	38	M	37162	+	+	-	Chronic	Anterior	-	-	-	Healed

GROUP OF PATIENTS WHO HAVE UN DERGONE CHEMICAL SPHINCTEROMY

SI NO	NAME	AGE	SEX	Hos No	Clinical Presentation			Types	Location	Result	Side Effects
					Pain	Bleading	Pruritus	Acute	Anterior		
								chronic	Posterior		
1	Sasikala	30	F	2192	+	+	-	Acute	Anterior	Healed	Headache
2	Malathi	38	F	2216	+	-	-	Chronic	Posterior	Healed	-
3	Amudha	42	F	2971	-	+	+	Acute	Posterior	-	Headache
4	Dillibabu	30	M	3935	+	+	-	Acute	Posterior	Healed	-
5	Gopal	37	M	4813	+	+	-	Acute	Posterior	Healed	-
6	Ragu	43	M	4793	+	+	-	Chronic	Posterior	Healed	-
7	Thulasiram	52	M	5294	+	+	-	Chronic	Posterior	-	Headache
8	NavaneethaKrishnan	38	M	7718	+	-	-	Acute	Posterior	Healed	Headache
9	Rao	31	M	9070	+	+	-	Acute	Posterior	Healed	-
10	Mary	33	F	9077	+	+	+	Chronic	Anterior	-	-
11	Jayanthi	32	F	9502	-	+	-	Acute	Posterior	Healed	-
12	Thayalnayagi	34	F	9602	+	+	-	Acute	Posterior	Healed	-
13	Sivakami	33	F	10163	+	+	-	Chronic	Posterior	-	-
14	Yasodha	40	F	10755	+	+	-	Chronic	Posterior	-	-
15	Latha	45	F	10795	-	-	-	Acute	Posterior	Healed	-
16	Raju	22	M	11369	+	+	-	Chronic	Posterior	Healed	-
17	Ravi	20	M	11631	+	+	-	Acute	Posterior	Healed	-
18	Thirumalai	24	M	11341	+	+	-	Acute	Posterior	Healed	-

19	Elila	37	F	11911	+	+	-	Chronic	Posterior	-	-
20	Dhinesh	40	M	11744	+	+	-	Chronic	Posterior	Healed	-

SI NO	**NAME**	**AGE**	**SEX**	**HOS No**	***Clinical Presentation***			***Types***	***Location***	**Result**	**Side Effects**
					Pain	**Bleading**	***Pruritus***	***Acute***	***Anterior***		
								chronic	***Posterior***		
21	Anandhi	31	F	12786	+	+	-	*Acute*	*Posterior*	Healed	Headache
22	Babu	21	M	14698	-	+	-	*Acute*	*Posterior*		-
23	Maharani	31	F	16126	+	+	-	*Acute*	*Posterior*	Healed	-
24	Padma	38	F	171192	+	-	+	*Chronic*	*Posterior*		-
25	Ganapathy	25	M	18521	+	-	-	*Acute*	*Posterior*	Healed	Headache
26	Nagarani	32	F	18672	+	+	-	*Chronic*	*Anterior*	Healed	-
27	Sasikala	43	F	19350	+	+	-	*Chronic*	*Anterior*		Headache
28	Magalakshmi	28	F	20553	+	+	-	*Acute*	*Posterior*	Healed	-
29	Sulochana	30	F	21103	+	+	-	*Chronic*	*Posterior*	Healed	Headache
30	Logu	28	M	21906	+	-	-	*Acute*	*Posterior*		-
31	Radha	27	F	22250	+	+	-	*Acute*	*Anterior*	Healed	-
32	Shankar	36	M	21310	+	+	-	*Chronic*	*Posterior*	Healed	Headache
33	Renuga	32	F	22987	+	+	-	*Acute*	*Posterior*	Healed	-
34	Madina	23	F	23599	+	+	-	*Chronic*	*Posterior*	-	-
35	Dhanapal	42	M	23293	+	-	-	*Chronic*	*Posterior*	-	-
36	Bommi	45	F	24180	+	+	-	*Chronic*	*Posterior*	-	-
37	Murugan	28	M	24158	+	+	-	*Acute*	*Posterior*	Healed	-
38	Selvapathy	28	M	24495	+	+	-	*Acute*	*Posterior*	Healed	Headache

39	Hari	38	M	26558	+	+	-	*Acute*	*Posterior*	Healed	-
40	Javed	22	M	28238	+	-	+	*Acute*	*Posterior*	Healed	-

SI NO	**NAME**	**AGE**	**SEX**	**HOS No**	**Clinical Presentation**			**Types**	**Location**	**Result**	**Side Effects**
					Pain	**Bleading**	**Pruritus**	**Acute**	**Anterior**		
								chronic	**Posterior**		
41	Pichandi	47	M	28721	+	-	-	Chronic	Posterior	-	-
42	Selvi	37	F	23131	+	+	-	Chronic	Posterior	Healed	-
43	Lakshmi	33	F	24328	+	+	-	Acute	Anterior	Healed	-
44	Regan	22	M	30011	+	+	-	Chronic	Posterior	-	Headache
45	Dhavamani	37	F	31781	+	+	-	Acute	Posterior	Healed	-
46	Mary Pushpa	43	F	35980	+	+	-	Chronic	Posterior	-	-
47	Ananthi	48	F	35982	+	+	-	Chronic	Posterior	Healed	-
48	Seetha	34	F	41035	-	+	-	Acute	Anterior	Healed	-
49	Sasikumar	55	M	41433	+	+	-	Chronic	Posterior	-	-
50	Karthik	22	F	41647	+	-	-	Acute	Posterior	Healed	Headache

BIBLIOGRAPHY

1. Skandalakis Surgical Anatomy, John.E.Skandalakis,Volume II.
2. Netter's Anatomy Atlas.
3. B.D.Chaurasia's,HumanAnatomy,Volume II,4th Edition.
4. Maingot'sAbdominal operations, 11th Edition.
5. Essential surgical practice,Cuschieri,Steele,Moossa,Volume II, 4th Edition.
6. Current Surgical Diagnosis and treatment,11th Edition.
7. Lee McGregor's Synopsis of surgical anatomy,12th Edition.
8. Sabiston, Textbook of Surgery,Volume II,17th Edition.
9. Schwartz,Principles of Surgery,8th Edition.
10. Mastery of Surgery, Baker, Fischer,Volume II,5th Edition.
11. Chassin's Operative strategy in General Surgery,3th Edition .
12. Zollinger's Atlas of Surgical operations,8th Edition.
13. Bailey and Love,Short practice of surgery,24th Edition.
14. The Washington Manual of Surgery,4th Edition.
15. Surgery of the anus,rectum and colon,Michael RB Keighley, Norman S Williams, Volume I, 2ndEdiiton.
16. ShackelFord,Surgery of Gastrointestinal tract,The Colon ,rectum and Anal canal,2nd Edition.